

WHAT IS CLAIMED IS:

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1. A charge transfer semiconductor device including a crystalline semiconductor film having rod-like or columnar crystals extending in a predetermined direction, said device comprising:

5 a charge storing means including a plurality of photodetecting elements, said photodetecting elements being for storing a charge in accordance with an incident light; and

a charge transfer means for transferring said charge stored in said charge stored means,

10 wherein said predetermined direction coincides or approximately coincides with a charge transfer direction of the charge transfer means.

2. A charge transfer semiconductor device including a crystalline semiconductor film having rod-like or columnar crystals extending in a predetermined direction, said device comprising:

15 a charge coupled device,

wherein said predetermined direction coincides or approximately coincides with a charge transfer direction of the charge coupled device.

20 3. A device according to claim 1 wherein the crystalline semiconductor film is formed on a quartz substrate and said incident light is made from a side of the quartz substrate.

4. A device according to claim 1 wherein said charge transfer direction includes a plurality of directions.

25 5. A device according to claim 1 further comprising an active matrix display device being integrated with said charge transfer means on the same substrate.

6. A device according to claim 2 further comprising an active matrix display device being integrated with said charge coupled device on the same substrate.

Conc...

~~1. A method of manufacturing a charge transfer semiconductor device including a crystalline semiconductor film having rod-like or columnar crystals extending in a predetermined direction, said method comprising the steps of:~~

~~forming an amorphous semiconductor film on an insulating surface;~~

5 ~~selectively introducing a metal element for promoting crystallization of said semiconductor in contact with a predetermined region of said amorphous semiconductor film;~~

~~heating to grow crystals in parallel with said insulating surface from said predetermined portion whereby said crystalline semiconductor film is formed;~~

10 ~~heating said crystalline semiconductor film in an oxidizing atmosphere including a halogen element to form a thermal oxidation film on a surface of the semiconductor film;~~

~~removing said thermal oxidation film; and~~

15 ~~forming a charge coupled device for transferring a charge in a direction that coincides or approximately coincides with said predetermined direction.~~

8. A method according to claim 7 wherein said insulating surface is a quartz substrate;

9. A method according to claim 7 wherein said metal element is at least one element selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, and

20 Au.

10. A method according to claim 7 wherein said crystalline semiconductor film is heated in the oxidizing atmosphere at 800-1100°C.

11. A device according to claim 2 wherein the crystalline semiconductor film is formed on a quartz substrate and an incident light is made from a side of the quartz substrate.

25 12. A device according to claim 2 wherein said charge transfer direction

includes a plurality of directions.

13. A device according to claim 1 wherein said semiconductor film is a silicon film.

14. A device according to claim 2 wherein said semiconductor film is a silicon film.

15. A method according to claim 7 wherein said semiconductor film is a silicon film.

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